

INTEGRATED STACKED MICROCHANNEL HEAT EXCHANGER AND HEAT SPREADER

Abstract

5 Integrated stacked microchannel heat exchanger and heat spreaders for
cooling integrated circuit (IC) dies and packages and cooling systems employing the
same are disclosed. In one embodiment, a stacked microchannel heat exchanger is
operatively and thermally coupled to an IC die or package using an interstitial solder
or a solderable material in combination with solder. In another embodiment, a
10 stacked microchannel heat exchanger is operatively and thermally coupled to an IC
die or package using an adhesive. In a further embodiment, a stacked microchannel
heat exchanger is operatively coupled to an IC die or package by fasteners and is
thermally coupled to the IC die or package using a thermal interface material. The
integrated stacked microchannel heat exchanger and heat spreaders may be
15 employed in a closed loop cooling system including a pump and a heat rejecter. The
integrated stacked microchannel heat exchanger and heat spreaders are configured
to support either a two-phase or a single-phase heat transfer process using a working
fluid such as water.